Audit Report

OFFICE OF THE INSPECTOR GENERAL

COMPONENT BREAKOUT OF THE ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILES

Report No. 97-218 September 22, 1997

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Acronym

AMRAAM	Advanced Medium Range Air-to-Air Missile

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

September 22, 1997

MEMORANDUM FOR ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Audit Report on Component Breakout of the Advanced Medium Range Air-to-Air Missile (Report No. 97-218)

We are providing this report for review and comment. We made the audit to follow up on Inspector General, DoD, Report No. 91-061, "Quick-Reaction Report on Component Breakout of the Advanced Medium Range Air-to-Air Missile Program," March 14, 1991. Comments on a draft report were considered in preparing this report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. Therefore, we request that the Air Force provide additional comments on Recommendations 1. and 2. by November 24, 1997.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Brian M. Flynn, Audit Program Director, at (703) 604-9051 (DSN 664-9051) or Mr. William D. Van Hoose, Audit Project Manager, at (703) 604-9034 (DSN 664-9034). See Appendix G for the report distribution. The audit team members are listed inside the back cover.

David K. Steensma

David K. Steensma
Deputy Assistant Inspector General
for Auditing

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Office of the Inspector General

Report No. 97-218 **September 22, 1997**
(Project No. 6AL-8007.01)

Component Breakout of the Advanced Medium Range Air-to-Air Missile

Executive Summary

Introduction. During our audit of "Hotline Allegations Concerning Contract Pricing of Advanced Medium Range Air-to-Air Missiles," Project No. 6AL-8007.00, we initiated this audit to follow up on Inspector General, DoD, Report No. 91-061, "Quick-Reaction Report on Component Breakout of the Advanced Medium Range Air-to-Air Missile Program," March 14, 1991.

The Air Force acquired 7,342 Advanced Medium Range Air-to-Air Missiles (AMRAAMs), excluding foreign military sales, through FY 1996 at a total cost of $6.6 billion in procurement funds. The Air Force planned to acquire 3,713 AMRAAMs for FYs 1997 through 2009 at a cost of $2.9 billion.

Audit Objective. The audit objective was to evaluate the Air Force actions to implement a component breakout program for the procurement of AMRAAMs. The audit also evaluated the Air Force management control program as applicable to the audit objective.

Audit Results. The Air Force did not take adequate actions to implement a component breakout program for the AMRAAM. As a result, the Air Force forfeited the opportunity to put funds to better use of as much as $195 million for AMRAAM procurements.

Recommendations in this report, if implemented, could decrease the costs for procurements of AMRAAMs and allow the Air Force to put $42.2 million to better use, of which $16.8 million are in the Future Years Defense Plan. See Part I for a discussion of the audit results. See Appendix A for details on the management control program.

Summary of Recommendations. We recommend the breakout of seven components of the AMRAAM beginning with the FY 2000 production. Also, we recommend the implementation of a program to identify and manage the risk of breaking out an additional 11 components and to break out those components when the risk is manageable. In addition, we recommend an annual review of the components of the AMRAAM to identify additional component breakout candidates.

Management Comments. The Assistant Secretary of the Air Force (Acquisition) and the Director, Air Superiority Weapons, Air Force Program Executive Office for

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Weapons, nonconcurred with the recommendations. The Assistant Secretary and the Director stated that the implementation of a component breakout program for the AMRAAM was not in the best interest of the Government. Also, they stated that component breakout is contrary to acquisition reform and streamlining initiatives. See Part I for a complete discussion of management comments. The full text of management comments is in Part III.

Audit Response. We maintain that the implementation of a component breakout program for the AMRAAM would result in funds that could be put to better use. Also, component breakout is a part of the acquisition reform interdependent goals to obtain better products, reduced costs for products, and reduced time frames for products. DoD Regulation 5000.2-R requires consideration of component breakout. Acquisition reform does not mean turning over all aspects of weapon systems acquisition and sustainment to contractors. The Air Force was unable to provide supporting analysis of breakout candidates since its October 1991 analysis. If the Program Office is not going to implement component breakout, despite the reduced cost, it must at a minimum determine how it is obtaining a better value by paying more money to have a contractor purchase the components from subcontractors. We request that the Air Force provide additional comments on the recommendations by November 24, 1997.

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Part I - Audit Results

Audit Background

During our audit of "Hotline Allegations Concerning Contract Pricing of Advanced Medium Range Air-to-Air Missiles," Project No. 6AL-8007.00, we initiated this audit to follow up on Inspector General, DoD, Report No. 91-061, "Quick-Reaction Report on Component Breakout of the Advanced Medium Range Air-to-Air Missile Program," March 14, 1991. The report recommended that the Air Force break out specific components of the Advanced Medium Range Air-to-Air Missile (AMRAAM). The AMRAAM is an air-to-air missile used by the Navy and the Air Force. The Air Force Air-to-Air Joint Systems Program Office acquires AMRAAMs from the Hughes Missile Systems Company (formerly Hughes Aircraft Company, Missile Systems Group) and the Raytheon Company. All production contract awards have been firm-fixed price contracts. Through FY 1996, the Air Force acquired a total of 7,342 AMRAAMs at $6.6 billion. Also, from FYs 1997 through 2009, the Air Force plans to acquire an additional 3,713 AMRAAMs. The Air Force estimated that the 3,713 AMRAAMs will cost $2.9 billion.

The Air Force acquired the AMRAAMs in lots of production. Through FY 1996, the Air Force had awarded contracts for AMRAAMs in Lots 1 through 10. Lots 11 through 21 are to provide the AMRAAMs that the Air Force plans to buy from FYs 1997 through 2009. Additionally, the March 13, 1996, Single Acquisition Management Plan states that the Air Force would likely purchase AMRAAMs beyond the scheduled 21 production lots.

Audit Objective

The audit objective was to evaluate the Air Force actions to implement a component breakout program for the procurement of AMRAAMs. We also evaluated the adequacy of the management control program related to the objective. See Appendix A for the coverage of the management control program and the audit scope and methodology. Appendix B summarizes the prior audits related to the audit objective.

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Component Breakout of the Advanced Medium Range Air-to-Air Missile

The Air Force Air-to-Air Joint System Program Office (Program Office) officials did not take adequate actions to implement a component breakout program for the procurement of the Advanced Medium Range Air-to-Air Missile (AMRAAM). The Program Office officials believed that a component breakout program was not appropriate for the AMRAAM. As a result, the Air Force forfeited opportunities to obtain cost reductions of as much as $195 million for procurements of AMRAAMs for production Lots 6 through 13, and the Air Force may forgo opportunities to obtain additional cost reductions of as much as $42.2 million for procurements in FYs 1997 through 2009. Approximately $16.8 million of the $42.2 million are funds that can be put to better use during the period of the FY 1998 Future Years Defense Plan.

Component Breakout

Definition of Component Breakout. Component breakout is the process in which DoD purchases components directly from suppliers and furnishes them directly to the prime contractors as Government-furnished material. For example, the prime contractors are manufacturing missiles that consist of components such as propulsion sections and fins. Instead of the prime contractors procuring those components, DoD would procure the components and provide them to the contractors. Component breakout eliminates the portion of the prime contractors' indirect costs and profits that relate to the components broken out, which achieves a reduction in procurement costs. The reduction is offset by the cost and the risk to the Government for awarding and administering contracts for Government-furnished material.

DoD Policy. DoD policy is that the weapon system program offices must consider component breakout on every program and should break out components when they could avoid significant amounts of cost (inclusive of Government administrative costs), when the technical or schedule risk for furnishing items to the prime contractor is manageable, and when no other overriding interests exist. The regulations governing component breakout are DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," March 15, 1996, and the DoD Federal Acquisition Regulation Supplement. See Appendix C for the detailed guidance contained in those regulations.

Prior Audit of Component Breakout. Component breakout of the AMRAAM was addressed previously in Inspector General, DoD, Report No. 91-061, "Quick-Reaction Report on Component Breakout of the Advanced Medium

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Range Air-to-Air Missile Program," March 14, 1991. The audit report identifies nine components that were sufficiently stable for component breakout. The report projects a potential cost avoidance of $180 million through Lot 10 without unduly increasing program risks if the Government provided the components to the prime contractors as Government-furnished material. In addition, the report identifies 26 other components that may have been suitable for breakout. The report estimates additional potential cost avoidance of $240 million through Lot 10 if those other 26 components were broken out. The report recommends that the Program Director for the AMRAAM conduct a breakout evaluation and break out components if the breakout evaluation showed that breakout would result in net savings without unduly increasing program risk.

Air Force Component Breakout Analysis. In October 1991, the Program Office completed a component breakout analysis in response to the Inspector General report. The breakout analysis examined 25 components; 18 of the 25 components were in the Inspector General report. The Program Office determined potential cost avoidance of $195 million for production Lots 6 through 13 if the Air Force broke out the 25 components alone. The Program Office concluded that the Air Force would not break out any components at that time for the following two reasons. First, components of the guidance and control sections were too complex for breakout. Of the 25 components examined, 21 components were parts of the guidance and control sections. Second, 18 of the 25 components examined were included in a Producibility Enhancement Program and would be replaced before the production of Lot 6. However, the report of the breakout analysis states that the Program Office did not plan to break out any additional components before Lot 8 but would review the AMRAAM component breakout plan on an annual basis with emphasis on low-risk components outside the guidance and control sections that had demonstrated production maturity.

The Program Office did not make any annual reviews of component breakout since its 1991 breakout analysis. Although in 1991, the Program Director for the AMRAAM stated in writing that the Program Office would review its component breakout plan on an annual basis, as of August 1997, the Program Office did not provide evidence that it had reviewed its component breakout plan since 1991.

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Air Force Implementation of Component Breakout

The Program Office did not take adequate actions to implement a component breakout program for the procurement of AMRAAMs. The Program Office presented the following four reasons for not taking any actions toward breaking out components.

o The components were too complex.

o The missile design was not stable.

o Component breakout could jeopardize the cost-effectiveness of competition.

o The Program Office did not have the necessary staff to manage a component breakout program because of staff reductions.

We disagree that those reasons justify not breaking out AMRAAM components for the following reasons.

Complex Components. The Air Force stated that component breakout of the guidance and control section was not feasible because of the complexity of the components. The Air Force did not provide any reasons why the complexity was not compatible with breakout. The statement that a component is too complex to be broken out is vague. The Air Force may have reasons not to break out complex components. However, to adequately analyze the situation and eliminate or reduce risk, the reasons for not breaking out the component must be more specific. For example, the Air Force may need specialized engineering skills to support the procurement process for a particular component. With that fact identified, the Program Office can determine the cost of obtaining the necessary engineering skills and factor that into its analysis. The Program Office must identify the basic reasons why a component should possibly not be broken out and then determine how to manage the associated risk.

Unstable Design. An unstable design should become stable; therefore, the Program Office should conduct annual reviews to identify candidates for component breakout. We agree that the Air Force should not have broken out components in the Producibility Enhancement Program in 1991. However, the Program Office should have reevaluated the components at the completion of the Producibility Enhancement Program. Since 1991, the Air Force received 5,132 AMRAAMs. Also, all contracts have been firm-fixed price, which implies a stable design.

Cost-Effectiveness of Competition. A component breakout program would not jeopardize competition but could supplement competition and provide additional cost avoidances. Inspector General, DoD, Report No. 97-157, "Hotline Allegations Concerning Contract Pricing of Advanced Medium Range Air-to-Air Missiles," June 10, 1997, reports significant differences between the costs proposed for components and the actual costs that the prime contractors incurred

for the components. For example, costs that the Hughes Missile Systems Company proposed for components for Lots 5 through 8 exceeded the actual costs by $41.6 million. Those differences would contribute to the cost avoidances that would accrue to the Government as part of a component breakout program. Appendix B summarizes Inspector General, DoD, Report No. 97-157.

Also, the Program Office may be able to obtain increased economic order quantity discounts because the Program Office would combine the order quantities of both prime contractors. In addition, we noted differences between the prices that the two prime contractors were paying for the same components. For example, in three of the seven components reviewed, the two prime contractors were paying significantly different prices for the same component from the same supplier. We were unable to determine the reason for the difference in price for the same component from the same supplier. Representatives from the Air Force could not explain the differences. Table 1 lists the components. The Program Office could procure the total procurement quantity from the supplier having the lowest price.

Table 1. Raytheon and Hughes Cost

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Further, the long-term competitive condition of the vendor base poses concerns. The Contractor Purchase System Review that the Defense Contract Management Command conducted at ********** on September 25, 1996, shows that 70 percent of the awarded purchase orders did not have adequate price competition. Additionally, the **********Purchase System Review No. 96-17, April 24, 1996, notes that 78 percent of the sample were single source or sole-source awards. The review concluded that ******** significantly reduced the list of qualified sources since implementatioin of the initiative to reduce its base of suppliers. The review expressed concern that the over-50-percent reduction in suppliers may be the cause for the significant decrease in competitive placement of awards. Although the Contractor Purchase

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System Review team believed that current prices were adequate, they were concerned over the long-term effect on material prices and source availability. The report states in part:

> . . . to ensure that long term agreements with single source suppliers is not detrimental to prices received on future procurements, the CPSR [Contractor Purchase System Review] Team recommended that a policy and procedure for second source development is established that would provide for a periodic review of the market for single source parts and suppliers.

A component breakout program could improve the concerns over the long-term competitive condition. Also, if a proposed Raytheon-Hughes-Texas Instruments merger is approved, component breakout may be the only means to achieve some competition in the AMRAAM program. Hughes, Raytheon, and Texas Instruments now control and compete against each other in the manufacture of virtually all air-to-air missiles used by the U.S. military.

Program Office Staffing. The lack of staffing in the Program Office is not necessarily a valid reason for not implementing a component breakout program. The Program Office can obtain the skills needed to manage a component breakout program. The Program Office must identify the skills needed and factor the cost of obtaining those skills into its component breakout analysis. The component breakout analysis conducted in 1991 included cost of additional staffing based on 1991 staffing levels and workload. When the Program Office develops a risk management program, it should calculate the staffing cost estimate based on contractor and in-house support.

Effect of Not Breaking Out Components

Based on its FY 1992 analysis, the Air Force forfeited opportunities to obtain cost reductions of as much as $195 million for procurements of AMRAAMs for production Lots 6 through 13. The Air Force may forgo opportunities to obtain additional cost reductions of as much as $42.2 million over the remaining procurements of AMRAAMs. Of the $42.2 million, the Air Force could achieve $24.2 million by breaking out 7 components and potentially another $18 million by identifying and managing the risk of component breakout for 11 other components.

Component Breakout Candidates. We reviewed 31 components of the AMRAAM used for production Lot 9 to determine whether they were suitable for component breakout. We based our review on the criteria for component breakout that Appendix C details. Out of the 31 components reviewed, the Air Force should break out 7 components beginning with Lot 14 (FY 2000 production). Appendix D discusses the seven components. Appendix E shows how the components satisfy the breakout criteria. The Program Office could put as much as $24.2 million to better use if it broke out the seven components

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for production Lots 14 through 21. See Appendix F for our calculation of the cost avoidance. Table 2 lists the components. We identified 13 of the 31 components that were not breakout candidates.

Table 2. Candidates for Component Breakout

Component	Cost Reduction Opportunities (millions)
Propulsion section	$12.418
Fins	4.292
Gyro harness	1.860
Safe and arming fuse	1.469
Warhead	1.759
Radome	1.426
Thermal initiated venting system cover	0.992
Total	**$24.216**

Potential Component Breakout Candidates. The Program Office should develop and implement a program to manage the risk that may be associated with the breakout of an additional 11 of the 31 components. If the additional 11 components were broken out beginning with Lot 14, the Air Force may be able to put as much as $18 million to better use. The majority of the 11 components are electronic components that are integrated into the missile guidance systems and as such pose a greater risk. Table 3 lists the additional components.

Table 3. Additional Components for Breakout Consideration

Component	Potential Cost Reduction Opportunities (millions)
Inertial reference unit	$ 9.563
Aft fuselage skin	2.571
Oscillator /multiplier	1.128
Crystal oscillator	1.006
Battery	0.265
Flexible cable	0.586
Converter grid bias	0.699
Channel selector	0.850
Torque and bearing assembly	0.168
Data link processor	0.676
Multiplier	0.502
Total	**$18.014**

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Summary

The Program Office needs to increase its efforts to break out components of the AMRAAM, especially because the Air Force will likely purchase AMRAAMs beyond the scheduled 21 production lots as stated in the March 13, 1996, Single Acquisition Management Plan. We recognize that risks are associated with component breakout. However, we believe that rather than avoiding all risk and forgoing reduced cost, the Program Office should identify and manage the risk. Because potential cost avoidance is significant, the Program Office should put forth its best effort to implement a component breakout program for the AMRAAM. In our opinion, the components presented in Table 2 of this report are stable, and the risks associated with breakout are minimal. We also believe that for some if not all of the items in Table 3, the Air Force can manage the risk. If the Air Force implemented a program to break out the components in Tables 2 and 3 for Lots 14 through 21, the Air Force could avoid costs of $42.2 million. Of the $42.2 million in costs, approximately $16.8 million are funds that can be put to better use during the period of the FY 1998 Future Years Defense Plan.

Recommendations, Management Comments, and Audit Response

1. We recommend that the System Program Director, Air-to-Air Joint System Program Office:

a. Break out the seven components listed in Table 2 in this report before the beginning of production Lot 14.

b. Develop and implement a program to identify and manage the risk associated with the breakout of the 11 components listed in Table 3 in this report and break out the components when the risk is manageable.

c. Review the components of the Advanced Medium Range Air-to-Air Missile annually to identify additional component breakout candidates.

Air Force Comments. The Director, Air Superiority Weapons, Air Force Program Executive Office for Weapons, provided comments for the Program Executive Office for Weapons and the Air-to-Air Joint System Program Office. He nonconcurred with the finding and recommendations. The Director did not specifically address each of the recommendations. However, the Director discussed why the implementation of a component breakout program for the AMRAAM was not in the best interest of the Government. The Director stated that the Program Office officials performed annual reviews to determine whether components of the AMRAAM should be broken out. As a result of those reviews, Program Office officials concluded that the components of the

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AMRAAM should not be broken out. The Director stated that component breakout was not in the best interest of the Government for the following reasons.

o The Program Office needs specialized engineering skills to procure the components because of the technical complexity of the components.

o The numerous changes to the AMRAAM to improve its capabilities have resulted in an unstable design.

o The implementation of a component breakout program will jeopardize cost benefits of competition.

o The implementation of a component breakout program will cause the Government to assume too much risk.

o Component breakout will result in the loss of the product performance warranty.

o The manufacture of some of the components has had problems; therefore, component breakout would result in those problems being transferred from the prime contractors to the Air Force.

o In calculation of projected savings, audit used prices that were based on joint purchases of components for AMRAAMs for both the U.S. Forces and Foreign Military Sales. If the Government procures only the components for the U.S. Forces, the unit prices could increase.

o Component breakout is contrary to acquisition reform and streamlining initiatives, and the Program Office staffing is on a steep decline for both Government positions and contractor support.

The Director stated that both of the prime contractors have encountered problems with the warhead and the propulsion section. He also stated that the warhead and propulsion section are being redesigned for Lot 12. The Director also stated that the guidance section and control section could not be broken out. The full text of the Director's comments is in Part III.

Audit Response. We maintain that the implementation of a component breakout program for the AMRAAM would result in funds that could be put to better use. During our review, Program Office officials were unable to provide us with documentation of any additional component breakout reviews conducted by the Program Office other than the October 1991 review. The Program Office response to the draft report asserted that the AMRAAM Integrated Product Team had annually reevaluated the October 1991 Component Breakout Study. However, the Program Office did not have supporting analyses of detailed component breakout reviews for the components considered.

Although the Director cited problems that successful component breakouts must overcome, he generally did not address how the problems prevented breakout of

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components that we recommended. If the Director would evaluate how each of his reasons pertains to each of the components for which we recommended breakout, he would find that his reasons are generally not applicable to the components that we recommended be broken out. For example, the Director did not discuss the radome, which is a protective housing for the radar antenna. From the beginning of the AMRAAM program, Corning has manufactured and supplied the radome to both Hughes and Raytheon. As discussed below, the Director's reasons for not implementing a component breakout program are not applicable to the radome.

o The Program Office does not need specialized skills to procure the radome. The radome and its manufacturing process may be technically complex, but the Program Office officials need not understand that process to procure the radome. For example, a person does not need to understand the science of refraction in order to procure a pair of eye glasses. Corning has supplied the radome for 10 years as a sole-source supplier to both Hughes and Raytheon. Corning does not require the assistance of either Hughes or Raytheon to manufacture the radome. Corning manufactures the radome to the specifications that the prime contractors provide, and an adequate technical data package is available to the Air Force. Personnel of the Defense Plant Representative Office at Corning provide quality control surveillance. The manufacturing process for the radome material is proprietary to Corning; therefore, Corning would likely be a sole-source supplier to the Government.

o The radome did not have numerous changes. Changes to a component are reflected in changes to the part number of that component. The part number for the radome did not change between production Lots 5 and 8. We are not aware of any change after Lot 8. Therefore, the design of the radome is very stable.

o Breaking out the radome will not jeopardize cost benefits of competition because competition is not a factor in the procurement of the radome. Competition is not a factor because both Hughes and Raytheon procure the radome from Corning on a sole-source basis. The Program Office would combine the procurement quantities of both Hughes and Raytheon and possibly obtain greater quantity discounts. Also, the Program Office could eliminate the price disparity between the prices that Hughes and Raytheon pay for the radome. ********** ********** The breakout could have resulted in funds of ********** ********** put to better use on the Lot 9 contract. As a minimum, the Program Office should have determined the basic reason for the disparity.

o The implementation of a component breakout program will cause the Government to assume some risk. However, a primary focus of acquisition reform is the change from risk avoidance to risk management. We believe that the Air Force can manage the risk. The radome breakout would pose little risk because Corning has supplied the radome for the last 10 years.

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o The Program Office will not know whether component breakout will affect the product warranty for the AMRAAM until it issues a request for proposal that specifies that certain components will be Government-furnished material. The warranty from Hughes or Raytheon may exclude the Government-furnished material. However, equivalent warranties maybe obtained from the Government-furnished material vendors, especially if such a warranty is the basis for the existing warranty.

o Our review did not reflect any significant problems with the manufacture of the radome. Raytheon officials stated that the radome had a problem regarding the size of scratches. However, the scratches involve only acceptance or rejection of the radome. Program Office engineering expertise would not be required. The prime contractors do not provide any engineering expertise to reduce the size of the scratches. Data obtained at Hughes, as of August 31, 1996, showed no rejections of radomes over the last 25 lots inspected. Also, Hughes officials did not mention that scratches were a problem.

o The unit price of the radome may or may not increase if Foreign Military Sales purchases were not in the Air Force buy because Corning would most likely continue to supply the total quantity of radomes. The unit price would vary with the quantity of items procured regardless of whether the Government procured the items from the prime contractor or from the vendor. In addition, we considered only Air Force planned procurements of AMRAAMs in calculating the $42.2 million that could be put to better use.

o Component breakout is not contrary to acquisition reform. DoD Regulation 5000.2-R requires consideration of component breakout. We understand that the acquisition workforce is reducing. However, we do not believe that the reduction in Program Office staffing is or should be an acquisition reform goal in and of itself. Rather, the reduction should be a logical consequence of business process reengineering. The Program Office must still make decisions, under acquisition reform, that balance cost, schedule, and performance. For the Program Office to implement component breakout, it needs to measure the impact of the reduced cost against the time to obtain AMRAAMs and the risk of how much better the AMRAAM will be with and without component breakout. The Program Office should also disclose the actions it is taking to ensure that the contractors control costs.

As just discussed in detail, the Director's reasons for not implementing a component breakout program are not applicable to the radome. Our point is that the Director should consider each component individually and not apply generalized reasons to all of the components of the AMRAAM.

The Director did not explain the specific problems that the prime contractors were encountering with the warhead and propulsion section. Therefore, we are unable to respond specifically, except to restate that other program offices for other missile systems have successfully broken out the warhead and propulsion sections. The Director stated that for both the warhead and propulsion sections of the AMRAAM Preplanned Product Improvement changes were only related

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to the U.S. missile. The Foreign Military Sales missiles were different configurations. As discussed above, we only considered Air Force procurements for AMRAAMs. Also, design changes for the warhead and propulsion section for Lot 12 should not affect breaking out those sections beginning with Lot 14. The Director's reasons for not breaking out the components indicated that the Program Office had not done component breakout analyses since the October 1991 analysis. We request that the Director reconsider his position and provide additional comments to this report.

2. We recommend that the Assistant Secretary of the Air Force (Acquisition), during the annual budget review, evaluate the System Program Director, Air-to-Air Joint System Program Office, actions to implement a breakout program for the Advance Medium Range Air-to-Air Missile.

Air Force Comments. The Assistant Secretary of the Air Force (Acquisition) nonconcurred with the finding and recommendations. His comments were generally the same comments that the Director, Air Superiority Weapons, Air Force Program Executive Office of Weapons, provided. However, he did not specifically address Recommendation 2. The full text of the Assistant Secretary's comments is in Part III.

Audit Response. We maintain that implementation of a component breakout program is a requirement that the AMRAAM program has not adequately accomplished. We request that the Assistant Secretary reconsider his position and provide additional comments to this report.

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Part II - Additional Information

Appendix A. Scope and Methodology

Scope

We evaluated the efforts of the Air Force to implement a component breakout program for the AMRAAM. Our review included the following 31 components of the AMRAAM: inertial reference unit, propulsion section, amplifier, safe and arming fuse, brushless direct current motor, gyros harness, oscillator multiplier, aft fuselage skin, fins, preplanned product improvement fins, warhead, thermal initiated venting system cover, switching amplifier, crystal oscillator, analog/digital converter, high converter, support terminal seeker, digital microcircuits (4), linear microcircuits, flexible cable, converter grid bias, battery terminal, battery, torque and bearing assembly, data link processor, channel selector, multiplier, and radome.

Our evaluation included identifying those components of the AMRAAM that satisfied what we considered the most significant criteria in the DoD Federal Acquisition Regulation Supplement, which Appendix C details. We evaluated the Air Force efforts to break out those components and the ways that the Air Force managed the risk associated with the breakout.

Methodology

Use of Computer-Processed Data. In our review, we used actual component costs that were generated by the contractors' computer system. Any inaccuracies in the contractors' data would be reflected in our calculated savings from component breakout.

Audit Period and Standards. We performed this economy and efficiency audit from August 1996 through March 1997. The audit was made in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD.

Organizations and Individuals Visited or Contacted

Contacts During the Audit. We visited or contacted individuals and organizations within DoD, the Hughes Missile Systems Company, and the Raytheon Company. Further details are available upon request.

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Management Control Program

DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of Management Control Program. We reviewed the adequacy of the AMRAAM Program Office management controls over the component breakout process. Specifically, we reviewed the efforts of the Air Force to implement a component breakout program for the Advanced Medium Range Air-To-Air Missile Program. We reviewed management's self-evaluation applicable to those controls.

Adequacy of Management Controls. The Air Force had management controls to ensure sufficient analyses of proposed component breakout candidates. The management control program was inadequate because the Air Force did not ensure that the Program Office followed the controls. Failure to implement the management controls is a material weakness. If management implements all report recommendations, then the Air Force should be able to reduce its cost for the procurement of AMRAAMs.

Adequacy of the Program Office Self-Evaluation. The AMRAAM program officials did not identify breakout as an assessable unit, and therefore did not identify or report the material management control weakness identified in this report.

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Appendix B. Summary of Prior Coverage

Inspector General, DoD, Report No. 97-157, "Hotline Allegations Concerning Contract Pricing of Advanced Medium Range Air-to-Air Missiles," June 10, 1997, states that the Air Force did not negotiate fair and reasonable prices for the Advanced Medium Range Air-to-Air Missiles. The report also states that the contractors provided the Air Force with cost or pricing data that were not current, accurate, and complete. We recommended a voluntary refund to the Government from Hughes Missile System Company of $41.6 million for excessive prices for Lots 5 through 8, a review of Lots 9 and 10 for additional excess prices, and a request of any appropriate voluntary refund. In addition, we recommended that the Air Force obtain adequate field price support and perform adequate analyses for major purchased parts included in the contractors' proposals for future contracts for AMRAAMs. The Defense Contract Audit Agency identified and is resolving the defective pricing issues. The Air Force did not agree to request a voluntary refund because it did not agree that it paid excessive prices for AMRAAMs. Also, the Air Force did not agree to review Lots 9 and 10 for excessive prices because it did not consider that it had paid excessive prices. In addition, the Air Force did not agree to obtain field price support and perform cost analyses for major purchased parts for future procurements of AMRAAMs. The final report requested that management reconsider its position and provide additional comments on the recommendations.

Inspector General, DoD, Report No. 91-061, "Quick-Reaction Report on Component Breakout of the Advanced Medium Range Air-to-Air Missile Program," March 14, 1991, states that nine components, seven within the guidance and control sections, exhibited sufficient design and manufacturers' process stability to be suitable for component breakout. The report projected estimated cost avoidance of $312 million starting with production Lot 6 through the remaining missile procurement without unduly increasing program risk if the components were broken out. The Air Force agreed that breakout at an appropriate time should result in costs avoided. However, the Air Force stated in its response that reliability problems experienced in Lot 1 testing identified a need for corrective action for many of the components identified in the audit report. Air Force officials estimated that they would complete corrective action by the end of FY 1991. The Program Office conducted a component breakout analysis, but concluded that breakout was not appropriate at that time. The Program Director stated that the Program Office would evaluate component breakout annually.

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Appendix C. Governing Regulations

DoD Regulation

DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," March 15, 1996, mandates that the Government must consider component breakout on every major acquisition program and should break out components when it could avoid significant cost, when it can manage the technical or schedule risk of furnishing Government items to the prime contractors, and when it has no other overriding Governmental interests. A decision not to break out any components requires justification.

DoD Federal Acquisition Regulation Supplement

DoD Federal Acquisition Regulation Supplement Appendix D establishes the procedures, methodology, and record requirements by which the Program Office conducts component breakout evaluations. The regulation provides the following criteria for evaluating a component for breakout.

1. Annual procurement of the component will normally exceed $1 million.

2. The end item contractor is not likely to do further design or engineering effort on the component. A suitable data package is available with rights to use it for Government acquisition. Quality control and reliability problems can be resolved without requiring effort by the end item contractor.

3. The component will not require further technical support.

4. Breakout will not impair logistics support.

5. Breakout will not unduly fragment administration, management, or performance of the end item contract.

6. Breakout can be accomplished without jeopardizing delivery requirements of the end item.

7. Advance acquisition funds can be made available.

8. A source other than the present manufacturer can supply the component.

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9. The Government has acquired the component directly as a support item in the supply system or as Government-furnished equipment in other end items.

10. The financial risks and other responsibilities that the Government assumed after breakout are acceptable.

11. Breakout will result in substantial net costs avoided.

The criteria are for guidance in making breakout analyses. Components do not have to satisfy all of the criteria to be broken out.

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Appendix D. Candidates for Component Breakout

We determined that the components shown below are prime candidates for component breakout. All components have stable designs and adequate technical data packages.

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Propulsion Section

Program offices other than that of AMRAAM have successfully broken out propulsion systems. Over the years, various suppliers have furnished propulsion systems for AMRAAMs. The prime contractors have encountered problems with propulsion systems, but those problems were typical of problems encountered in other missile programs that have successfully broken out the propulsion system. The prime contractors have not returned a significant number of propulsion systems to the suppliers. The prime contractors do not do any additional work on the propulsion systems upon receipt from the suppliers; they only test and install the system into the AMRAAM.

Fins

A number of suppliers have produced the fins over the years. The current supplier for one of the prime contractors has been producing the fins for 4 years. The supplier has an excellent record for high-quality performance and meeting the delivery schedule. The prime contractors have not returned a significant number of fins to the suppliers. The prime contractors do not do any additional work on the fins upon receipt from the suppliers; they only test and install the fins on the AMRAAM.

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Gyro Harness

A number of suppliers produced the component through the years. The current supplier, Litton Guidance, has produced the gyro harness for one of the prime contractors for 6 years. Further, the supplier has delivered the component ahead of schedule, while maintaining high-quality performance. The prime contractors have not returned a significant number of gyro harnesses to the suppliers. The prime contractors do not do any additional work on the gyro harness upon receipt from the suppliers; they only test and install the gyro harness onto the AMRAAM.

Safe and Arming Fuse

A number of suppliers produced the safe and arming fuse through the years. The Kaman Aerospace Corporation has produced the safe and arming fuse for more than 6 years for one of the prime contractors. The supplier has met the delivery schedule. The prime contractors have not returned a significant number of the components to the suppliers. The component uses explosive devices, and the problems that the prime contractors experienced are typical of the type and nature of components using explosives. The prime contractors do not do any additional work on the safe and arming fuse upon receipt from the suppliers; they only test and install the safe and arming fuse onto the AMRAAM.

Warhead

Program offices other than AMRAAM have successfully broken out the warhead. Babcock & Wilcox has been producing the warhead for 5 years. The problems encountered with the component are generally related to the explosives used and are typical of that type of component. The prime contractors have not returned a significant number of the components to the suppliers. The prime contractors do not do any additional work on the warhead upon receipt from the suppliers; they only test and install the warhead onto the AMRAAM.

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Radome

Corning Glass Works has been producing radomes for the AMRAAM since 1987 and is the only supplier of the radome. Corning Glass Works has an outstanding record of meeting the delivery schedule. The prime contractors have not returned a significant number of radomes to Corning Glass Works. The prime contractors do not do any additional work on the radome upon receipt from the suppliers; they only test and install the radome onto the AMRAAM.

Thermal Initiated Venting System Cover

The supplier of the component for one of the prime contractors has a record of delivering high-quality thermal initiated venting system covers. The supplier has met the contract delivery schedule. The prime contractors have not returned a significant number of thermal initiated venting system covers to the suppliers. Additionally, the prime contractors do not do any additional work on the thermal initiated venting system cover upon receipt from the suppliers; they only test and install the cover onto the AMRAAM.

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Appendix E. Summary of Component Breakout Analysis

	Component Breakout Criteria										
	1	2	3	4	5	6	7	8	9	10	11
Propulsion section	Yes	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Fins	Yes	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Gyro harness	A	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Safe and arming fuse	A	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Warhead	A	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Radome	A	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Thermal initiated venting system cover	No	Yes	B	Yes	Yes	Yes	N/A	C	C	Yes	Yes
Inertial reference unit	Yes	Yes	B	Yes	Yes	Yes	N/A	Yes	C	D	Yes
Aft fuselage skin	Yes	Yes	B	Yes	Yes	Yes	N/A	Yes	C	D	Yes
Oscillator/multiplier	No	Yes	B	Yes	Yes	Yes	N/A	Yes	C	D	Yes
Crystal oscillator	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Battery	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Flexible cable	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Converter grid bias	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Channel selector	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Torque and bearing assembly	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Data link processor	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes
Multiplier	No	Yes	B	Yes	Yes	Yes	N/A	C	C	D	Yes

A. FY 1998 Budget Estimate increases in early years and slightly decreases quantities in later years.
B. If technical support is required, the Program Office can make any necessary arrangements to obtain the technical support.
C. Our review did not address the criteria.
D. If aggressively managed, the risk is manageable.

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1. Annual procurement of the component will normally exceed $1 million.

2. The end item contractor is not likely to do further design or engineering effort on the component. A suitable data package is available with rights to use it for Government acquisition. Quality control and reliability problems can be resolved without requiring effort by the end item contractor.

3. The component will not require further technical support.

4. Breakout will not impair logistics support.

5. Breakout will not unduly fragment administration, management, or performance of the end item contract.

6. Breakout can be accomplished without jeopardizing delivery requirements of the end item.

7. Advance acquisition funds could be made available.

8. A source other than the present manufacturer can supply the component.

9. The Government has acquired the component directly as a support item in the supply system or as Government-furnished equipment in other end items.

10. The financial risks and other responsibilities that the Government assumed after breakout are acceptable.

11. Breakout will result in substantial net costs avoided.

The above criteria are for guidance in making breakout analyses. Components do not have to satisfy all of the criteria to be broken out.

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Appendix F. Computation of Cost Avoidance

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[1]Then-year cost is the quantity of the component per missile, times number of missiles per production lot, times average price for the component for production Lot 9, times the then-year escalation factor. The average component price is the average price paid by both contractors for the component. Appendix D includes the number of components per missile and the average component price. The FY 1997 President's budget quantities were such that several of the selected items did not initially achieve the required $1 million in annual acquisition cost as recommended by DoD Federal Acquisition Regulation Supplement Appendix D. However, the preliminary FY 1998 Budget Estimate increases the quantities in the early years while slightly decreasing the quantities in the later years. Additionally, the March 13, 1996, Single Acquisition Management Plan states that the Air Force would likely purchase AMRAAMs beyond the scheduled 21 production lots. Therefore, we believe that the selected components satisfy the intent of the Federal Acquisition Regulation criteria.

[2]We determined the projected cost avoidance to be the overhead and general administrative costs and profit that the contractors would add to the vendor's price to arrive at the cost to propose to the Air Force. We estimated the costs to be to *** ********** The wrap rate is the relationship of the contractors' overhead and general and administrative costs to the vendor's price.

[3]The estimated Government cost is the then-year cost times an estimated Government wrap rate of 15 percent. The Government wrap rate was estimated at 15 percent based on prior Inspector General, DoD, component breakout reviews. The wrap rate adjusts the projected cost avoidance to exclude the administrative costs of the Government.

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Appendix G. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
  Deputy Under Secretary of Defense (Acquisition Reform)
  Director, Defense Procurement
  Director, Defense Logistics Studies Information Exchange
Under Secretary of Defense (Comptroller)
  Deputy Chief Financial Officer
  Deputy Comptroller (Program/Budget)

Department of the Army

Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Acquisition)
  Program Executive Officer for the Advanced Medium Range Air-to-Air Missile
    System Program Director, Air-to-Air Joint System Program Office
Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force

Other Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
  Commander, Defense Contract Management Command
Director, National Security Agency
  Inspector General, National Security Agency
Inspector General, Defense Intelligence Agency

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Non-Defense Federal Organizations and Individuals

Office of Management and Budget
Technical Information Center, National Security and International Affairs Division, General Accounting Office

Chairman and ranking minority member of each of the following congressional committees and subcommittees:

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Government Reform and Oversight
House Subcommittee on Government Management, Information and Technology, Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Committee on National Security

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Part III - Management Comments

Assistant Secretary of the Air Force (Acquisition) Comments

DEPARTMENT OF THE AIR FORCE
WASHINGTON DC

OFFICE OF THE ASSISTANT SECRETARY

11 August 1997

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
OFFICE OF THE INSPECTOR GENERAL
DEPARTMENT OF DEFENSE

FROM: SAF/AQ

SUBJECT: DODIG Material Code 6AL-8007.01
TITLE: COMPONENT BREAKOUT OF THE ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE

This is in reply to your memorandum requesting the Assistant Secretary of the Air Force (Acquisition) to provide Air Force comments on subject report.

I overall non-concur with the DODIG findings associated with component breakout of the Advanced Medium Range Air-to-Air Missile (AMRAAM). Specific comments for each of the audits sub-areas are attached. If you have any questions associated with these comments, please contact the AMRAAM PEM, Maj Mike Stuart, SAF/AQPF, at 697-6483.

ARTHUR L. MONEY
Assistant Secretary of the Air Force
(Acquisition)

Attachment
Comments to DOD IG Draft Report

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Final Repo
Reference

AMRAAM COMMENTS ON DODIG Material Code 6AL-8007.01

1. We have reviewed the subject draft report of audit and submit our management comments.

Executive Summary

2. **Introduction.** Noted.

3. **Audit Objective.** Noted.

4. **Audit Results.** Nonconcur. See detailed comments below.

5. **Summary of Recommendations.** Nonconcur. See detailed comments below.

PART I - Audit Results

6. **Audit Background.** Noted. All numbers in the report include not only Air Force but also Navy procurement. Third sentence from end of first paragraph states "prices totaling $4.7 billion." This value should be $6.6 billion. Second sentence from end of first paragraph states "from FYs 1997 through 2009". This sentence should read "from FYs 1997 through 2007". AMRAAM's last procurement year is 2007. Revised

7. **Audit Objective.** Noted.

8. **Component Breakout of the Advanced Medium Range Air-to-Air Missile.** Nonconcur. The Air-to-Air Joint Systems Program Office (JSPO) has annually reviewed the component breakout criteria and determined that it is not a reasonable strategy for the AMRAAM missile. The JSPO analysis of the component breakout of the missile hardware shows actual cost increases to the government and the assumption of substantial risks as experienced with the Missile Rail Launcher (MRL) contract.

The JSPO has broken out several items of the AMRAAM System, including the MRL, Captive Carry Training Missile, Missile BIT Test Set, all of the missile containers, Common Field-level Memory Reprogrammable Equipment, Warhead Replaceable Tactical Telemetry, and the Depot equipment. These efforts were conducted with varying levels of success. For example, when the JSPO selected a contractor for "broken out" production of the MRL, the contractor could not make delivery and subsequently went bankrupt. This resulted in significant delays and added costs while not meeting the USAF's and Navy's operational requirements.

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Background

9. **Definition of Component Breakout.** Noted.

10. **DoD Policy.** Noted.

11. **Prior Audit of Component Breakout.** Noted.

12. **Air Force Component Breakout Analysis.** Non-Concur. The AMRAAM IPT responsible for the acquisition strategy and missile buy has each year re-evaluated the October 1991 Component Breakout Study. The IPT's decision each year can be summed up as follows: The decision to not break out guidance or control section items was sound and there is even more reason (acquisition reform with streamlining initiatives) to not break out these items in 1997 and later. Both primes have had problems with the subcontractors for warheads and rocket motors and providing these items as GFE requires the Government to assume too much risk. Further, these items are being redesigned for Lot 12, forward.

The decision made by the acquisition team is documented in the AMRAAM Single Acquisition Management Plan (SAMP), Rev 1, dated 22 August 1996. This plan is reviewed and approved by the Assistant Secretary of the Air Force (Acquisition) SAF/AQ. Specific words can be found in Paragraph V.2.g: "Lot 11/12. Lot 11 will be a dual competitive award with Lot 12 as CFI option to the Lot 11 contract. The number of missiles being procured for FMS customers will continue to make dual sources the most attractive acquisition strategy. Multi-year procurement and expanded component breakouts have been analyzed, but are not recommended at this time."

13. **Air Force Implementation of Component Breakout.** Noted. The four reasons cited on page 5 of the audit report constitute prior evidence that analysis had been conducted, invalidating the finding mentioned in the "Component Breakout" section of the report (pages 3&4).

14. **Complex Components.** Non-concur. The JSPO 1991 Component Breakout analysis report clearly stated the technical complexity of the guidance components and the need for specialized engineering skills to procure these components. That assessment is even more true today as a result of the many improvements added to the system through the value engineering program and pre-planned product improvement programs. The AMRAAM is an ever evolving state-of-the-art missile system in which every small change potentially impacts the entire system. The AMRAAM JSPO would have to duplicate the contractor's specialized engineering staffs and systems engineering staffs to adequately procure components for the system. This is completely contrary to the Acquisition Reform initiatives. Furthermore, the audit (page 5, paragraph 2) acknowledges that components in the Producibility Enhancement Program should not have been broken out. That program was complete in 1995 but the programs mentioned above are ongoing.

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15. **Unstable Design.** Non-concur. Firm fixed price contracts do not, by definition, imply a stable design. The AMRAAM program has averaged changes of 15-20% of the missile per year between lots 7 through 12 using a block change approach as documented in the current AMRAAM retrofit study. AMRAAM P3I Phase 1 component changes in Lot 8; Anti-Tampering requirements changes in lots 9, 10, and 11; Phase 2 component changes in lot 12; and projected P3I Phase 3 component changes in lot 15 together with multiple increments of value engineering changes significantly impact the stability of the design. The goal of the JSPO is to continue improving the capabilities of this missile for the warfighter in a graduated approach.

16. **Cost-Effectiveness of Competition.** Non-concur. The AMRAAM competition has been highly successful in bringing the costs of the hardware down. The Air Force non-concurred with the data and conclusions of Inspector General, DoD, Draft Report, Project No. 6AL-8007, "Hotline Allegations Concerning Contract Pricing of Advanced Medium Range Air-to-Air Missile," December 12, 1996. This section disputes itself. First it states that component breakout will not jeopardize competition and then it states the program office may combine quantities which in fact would eliminate competition. These components are highly specialized items which require substantial efforts to qualify vendors. If all components go to a single vendor, that vendor in fact becomes a sole-source provider. Differences in contractors prices represent the forces of competition driving vendor cost down for multiple reasons. A price disparity does not represent a problem, it represents real actions to control costs. The fact that a large portion of Raytheon's awards were single source, does not take away from the fact that these vendors are essentially competing with Hughes vendors through the Raytheon competition. The Air Force has no control over costs the contractors incur on a FFP contract. Each contractor negotiated their own best deal with vendors of their own choice. Air Force price is the same, regardless of arrangements the contractor may realize after contract award.

17. **Program Office Staffing.** Non-Concur. Under Public Law and SAF/AQ's acquisition reform lightening bolt's, JSPO staffing is on a steep decline both for government (military and civilian) positions and contractor in-house support. JSPO manning in 1993 was 284, is now 141, and must be further reduced to 80 by the fourth quarter of FY 1999. Under these circumstances, in-house expertise is necessarily limited.

18. **Effect of Not Breaking Out Components.** Non-Concur. See responses in following paragraphs.

19. **Component Breakout Candidates.** Non-Concur. There are multiple reasons for not breaking out the components listed in Appendix F. The following is a summary of some of these reasons.

Guidance Section Components:

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Component Breakout Criteria 2. These components have undergone significant changes in Lots 8, 9, 10, and 11 to implement the AMRAAM P3I Phase 1 components, the Anti-Tampering requirements, and the continuing Value Engineering changes which continue to decrease the cost of the missile. Lot 12 will contain other major component changes including the Quad TDD. Lot 15 is scheduled to be another major update to the guidance system components resulting from the AMRAAM P3I Phase 3 upgrade.
Component Breakout Criteria 5. AMRAAM is procured under an essential performance warranty. Currently the producers are offering a 10 year bumper-to-bumper warranty. Projected savings as a result of this warranty over Lots 14 thru 21 is estimated to be greater than $10 million. Under component breakout the producers would not be able to offer the essential performance warranty.
Component Breakout Criteria 6. One of the major problems the producers have had is obtaining piece parts and assemblies to meet their delivery requirements. Under the system acquisition approach, the producer is responsible for these components and the U.S. government is given consideration for delays in schedule. Under component breakout, the U.S. government would become liable and would have to compensate the missile producers for delays in receipt of material.
Component Breakout Criteria 10. The financial risks and other responsibilities assumed by the government after breakout are not acceptable. Changing components to upgrade missile performance add substantial risk; loss of essential performance warranty adds government cost not calculated in the audit report; and liability to the producers to meet delivery requirements of the end item contract would be unacceptable. This liability would be not only U.S. deliveries but also FMS deliveries. In Lot 11, FMS was 71% of the missile buy. Under component breakout from lots 14 through lot 21, the U.S. would be financially liable for risk and late delivery of more than $120M worth of FMS components considering only the first seven components of the audit report.

Warhead Section:

Component Breakout Criteria 2. The Warhead was significantly changed under AMRAAM P3I Phase 2. This change upgraded the U.S. missile but will not be implemented on the FMS missile. Therefore, there are now two warhead configurations.

Component Breakout Criteria's 10 and 11. Depending on how the component breakout were accomplished, the projected savings would either not be realized or the added risk to the government to procure FMS unique components would be unacceptable. The cost savings projected in the audit report used a price which includes the joint purchase of U.S. and FMS warheads. Beginning in lot 12, these warheads will be different. If the producers procure both warheads from the same vendor, the current price breaks for quantity should stay in place. If the U.S. procured the U.S. unique warheads without the leverage of the FMS quantities which are projected to be 600 per year, the U.S. price could increase. Based on missile cost/quantity relationships from the lot 11 procurement, the price would increase 52% based on the 300 U.S. missiles per year projected in lots 14 through 17, and 32% for the 450 U.S. missiles per year projected in

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lots 18 through 21. This would cause the unit cost to increase rather than decrease as a result of component breakout.

Propulsion Section:

Component Breakout Criteria 2. The Rocket Motor was significantly changed under AMRAAM P3I Phase 2 with an overall increase in length of 5 inches. This change upgraded the U.S. missile but will not be implemented on the FMS missile. Therefore, there are now two propulsion configurations.

Component Breakout Criteria 10 and 11. As with the Warhead , depending on how the component breakout were accomplished, the projected savings would either not be realized or the added risk to the government to procure FMS unique components would be unacceptable. The cost savings projected in the audit report use a price which includes the joint purchase of U.S. and FMS propulsion systems Beginning in lot 12, these propulsion systems will be different. If the producers procure both motors from the same vendor, the current price breaks for quantity should stay in place. If the U.S. procured the U.S. unique propulsion without the leverage of the FMS quantities which are projected to be 600 per year, the U.S. price could increase. Based on missile cost/quantity relationships from the lot 11 procurement, the price would increase 52% based on the 300 U.S. missiles per year projected in lots 14 through 17, and 32% for the 450 U.S. missiles per year projected in lots 18 through 21. This would cause the unit cost to increase rather than decrease as a result of component breakout.

Control Section:

Component Breakout Criteria 2. The Control section was significantly changed under AMRAAM P3I Phase 2 to accommodate the increase in length of 5 inches in the propulsion section. This change upgraded the U.S. missile but will not be implemented on the FMS missile. Therefore, there are now two control section configurations.

Component Breakout Criteria 10 and 11. As with the Warhead and Rocket Motor, depending on how the component breakout were accomplished, the projected savings would either not be realized or the added risk to the government to procure FMS unique components would be unacceptable. The cost savings projected in the audit report use a price which includes the joint purchase of U.S. and FMS control sections. Beginning in lot 12, these control sections will be different. If the producers procure both sections from the same vendor, the current price breaks for quantity should stay in place. If the U.S. procured the U.S. unique control section without the leverage of the FMS quantities which are projected to be 600 per year, the U.S. price could increase. Based on missile cost/quantity relationships from the lot 11 procurement, the price would increase 52% based on the 300 U.S. missiles per year projected in lots 14 through 17, and 32% for the 450 U.S. missiles per year projected in lots 18 through 21. This would cause the unit cost to increase rather than decrease as a result of component breakout.

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20. **Potential Component Breakout Candidates.** Non-Concur. All of these components are guidance section components and the rationale provided under Component Breakout Candidates above also applies for these components.

21. **Summary.** Non-Concur. We have demonstrated that the components in Table 2 and Table 3 are not stable. The interaction of the FMS program in maintaining a reduced cost missile is paramount in obtaining a continually improving missile for the warfighter while maintaining reasonable risks and costs.

22. **Recommendations for Corrective Action.** Non-Concur.
1) The System Program Director, Air-to-Air Joint System Program Office evaluates the risks and potential cost savings of component breakout annually. Cost savings are not valid as a result of loss of FMS economic order quantities and the loss of the 10 year bumper-to-bumper essential performance reliability, while government risks are substantially increased as a consequence of the continuing upgrade to the AMRAAM missile.
2) SAF/AQ agrees with the System Program Director and has directed implementation of additional acquisition reforms including putting more responsibilities on the producers and decreasing the size of the Joint Systems Program Office even further than currently projected.

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Program Executive Office for Weapons and Air-to-Air Joint System Program Office Comments

DEPARTMENT OF THE AIR FORCE
AIR FORCE PROGRAM EXECUTIVE OFFICE
WASHINGTON, DC 20330-1000

10 Apr 97

MEMORANDUM FOR OFFICE OF ASSISTANT INSPECTOR GENERAL
DEPARTMENT OF DEFENSE, AUDITING

FROM: AFPEO/WP

SUBJECT: DOD IG Draft Audit Report, "Component Breakout of Advanced Medium Range Air-to-Air Missile (AMRAAM)", Project No. 6AL-8007.01.

The referenced DOD IG Draft Report has been reviewed by my office and the AMRAAM Joint System Program Office, Eglin AFB Fl, with the attached comments submitted for your consideration. If you have any questions, please contact me (703) 695-9374.

JOSEPH M PANETTA JR, Major, USAF
Director, Air Superiority Weapons
Air Force Program Executive Office
for Weapons

Attachment
Comments to DOD IG Draft Report

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Program Executive Office for Weapons and Air-to-Air Joint System Program Office Comments

SUBJECT: DoD Inspector General Draft Audit Report Component Breakout of the Advanced Medium Range Air-to-Air Missile

1. We have reviewed the subject draft report of audit and submit our management comments.

PART I - Audit Results

2. **Audit Background.** Noted. All numbers in the report include not only Air Force but also Navy procurement. Third sentence from end of first paragraph states "prices totaling $4.7 billion." This value should be $6.6 billion. Second sentence from end of first paragraph states "from FYs 1997 through 2009". This sentence should read "from FYs 1997 through 2007". AMRAAM's last procurement year is 2007.

3. **Audit Objective.** Noted.

4. **Component Breakout of the Advanced Medium Range Air-to-Air Missile.** Non-Concur. The Air-to-Air Joint Systems Program Office (JSPO) has annually reviewed the component breakout criteria and determined that it is not a reasonable strategy for the AMRAAM missile. The JSPO analysis of the component breakout of the missile hardware shows actual cost increases to the government and the assumption of substantial risks as experienced with the Missile Rail Launcher (MRL) contract.

The JSPO has broken out several items of the AMRAAM System, including the MRL, Captive Carry Training Missile, Missile BIT Test Set, all of the missile containers, Common Field-level Memory Reprogrammable Equipment, Warhead Replaceable Tactical Telemetry, and the Depot equipment. These efforts were conducted with varying levels of success. A JSPO awarded MRL production contractor could not make delivery and subsequently went bankrupt resulting in significant delays and added costs while not meeting the USAF's and Navy's operational requirements.

Background

5. **Definition of Component Breakout.** Noted.

6. **DoD Policy.** Noted.

7. **Prior Audit of Component Breakout.** Noted.

8. **Air Force Component Breakout Analysis.** Non-Concur. The AMRAAM IPT responsible for the acquisition strategy and missile buy has each year re-evaluated the October 1991 Component Breakout Study. The IPT's decision each year can be summed up as follows: The decision to not break out guidance or control section items was sound and there is even more reason (acquisition reform with streamlining initiatives) to not break out these items in 1997 and later. Both primes have had problems with the

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subcontractors for warheads and rocket motors and providing these items as GFE requires the Government to assume too much risk. Further, these items are being redesigned for Lot 12, forward.

The decision made by the acquisition team is documented in the AMRAAM Single Acquisition Management Plan (SAMP), Rev 1, dated 22 August 1996. This plan is reviewed and approved by the Assistant Secretary of the Air Force (Acquisition) SAF/AQ. Specific words can be found in Paragraph V.2.g: "Lot 11/12. Lot 11 will be a dual competitive award with Lot 12 as CFI option to the Lot 11 contract. The number of missiles being procured for FMS customers will continue to make dual sources the most attractive acquisition strategy. Multi-year procurement and expanded component breakouts have been analyzed, but are not recommended at this time."

9. **Air Force Implementation of Component Breakout.** Noted.

10. **Complex Components.** Non-concur. The JSPO 1991 Component Breakout analysis report clearly stated the technical complexity of the guidance components and the need for specialized engineering skills to procure these components. That assessment is even more true today as a result of the many improvements added to the system through the value engineering program and pre-planned product improvement programs. The AMRAAM is an ever evolving state-of-the-art missile system in which every small change potentially impacts the entire system. The AMRAAM JSPO would have to duplicate the contractor's specialized engineering staffs and systems engineering staffs to adequately procure components for the system. This is completely contrary to the Acquisition Reform initiatives.

11. **Unstable Design.** Non-concur. Firm fixed price contracts do not by definition imply a stable design. The AMRAAM program has averaged changes of 15-20% of the missile per year between lots 7 through 12 using a block change approach as documented in the current AMRAAM retrofit study. AMRAAM P3I Phase 1 component changes in Lot 8; Anti-Tampering requirements changes in lots 9, 10, and 11; Phase 2 component changes in lot 12; and projected P3I Phase 3 component changes in lot 15 together with multiple increments of value engineering changes significantly impact the stability of the design. The goal of the JSPO is to continue improving the capabilities of this missile for the warfighter in a graduated approach.

12. **Savings from Competition.** Non-concur. The AMRAAM competition has been highly successful in bringing the costs of the hardware down. The Air Force non-concurred with the data and conclusions of Inspector General, DoD, Draft Report, Project No. 6AL-8007, "Hotline Allegations Concerning Contract Pricing of Advanced Medium Range Air-to-Air Missile," December 12, 1996. This paragraph disputes itself. First it states that component breakout will not jeopardize competition and then it states the program office may combine quantities which in fact would eliminate competition. These components are highly specialized items which require substantial efforts to qualify vendors. If all components go to a single vendor, that vendor in fact becomes a

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sole source provider. Differences in contractors prices represent the forces of competition driving vendor cost down for multiple reasons. A price disparity does not represent a problem, it represents real actions to control costs. The fact that a large portion of Raytheon's awards were single source, does not take away from the fact that these vendors are essentially competing with Hughes vendors through the Raytheon competition.

13. **Program Office Staffing.** Non-Concur. Under SAF/AQ's acquisition reform lightening bolt's, JSPO staffing is on a steep decline both for government (military and civilian) positions and contractor in house support.

14. **Effect of Not Breaking Out Components.** Non-Concur. See responses in following paragraphs.

15. **Component Breakout Candidates.** Non-Concur. There are multiple reasons for not breaking out the components listed in Appendix F. The following is a summary of some of these reasons.

Guidance Section Components:

Component Breakout Criteria 2. These components have undergone significant changes in Lots 8, 9, 10, and 11 to implement the AMRAAM P3I Phase 1 components, the Anti-Tampering requirements, and the continuing Value Engineering changes which continue to decrease the cost of the missile. Lot 12 will contain other major component changes including the Quad TDD. Lot 15 is scheduled to be another major update to the guidance system components resulting from the AMRAAM P3I Phase 3 upgrade.
Component Breakout Criteria 5. AMRAAM is procured under an essential performance warranty. Currently the producers are offering a 10 year bumper-to-bumper warranty. Projected savings as a result of this warranty over Lots 14 thru 21 is estimated to be greater than $10 million. Under component breakout the producers would not be able to offer the essential performance warranty.
Component Breakout Criteria 6. One of the major problems the producers have had is obtaining piece parts and assemblies to meet their delivery requirements. Under the system acquisition approach, the producer is responsible for these components and the U.S. government is given consideration for delays in schedule. Under component breakout, the U.S. government would become liable and would have to compensate the missile producers for delays in receipt of material.
Component Breakout Criteria 10. The financial risks and other responsibilities assumed by the government after breakout are not acceptable. Changing components to upgrade missile performance add substantial risk; loss of essential performance warranty adds government cost not calculated in the audit report; and liability to the producers to meet delivery requirements of the end item contract would be unacceptable. This liability would be not only U.S. deliveries but also FMS deliveries. In Lot 11, FMS was 71% of the missile buy. Under component breakout from lots 14 through lot 21, the U.S. would

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be financially liable for risk and late delivery of more than $120M worth of FMS components considering only the first seven components of the audit report.

Warhead Section:

Component Breakout Criteria 2. The Warhead was significantly changed under AMRAAM P3I Phase 2. This change upgraded the U.S. missile but will not be implemented on the FMS missile. Therefore, there are now two warhead configurations.

Component Breakout Criteria's 10 and 11. Depending on how the component breakout were accomplished, the projected savings would either not be realized or the added risk to the government to procure FMS unique components would be unacceptable. The cost savings projected in the audit report used a price which includes the joint purchase of U.S. and FMS warheads. Beginning in lot 12, these warheads will be different. If the producers procure both warheads from the same vendor, the current price breaks for quantity should stay in place. If the U.S. procured the U.S. unique warheads without the leverage of the FMS quantities which are projected to be 600 per year, the U.S. price could increase. Based on missile cost/quantity relationships from the lot 11 procurement, the price would increase 52% based on the 300 U.S. missiles per year projected in lots 14 through 17, and 32% for the 450 U.S. missiles per year projected in lots 18 through 21. This would cause the unit cost to increase rather than decrease as a result of component breakout.

Propulsion Section:

Component Breakout Criteria 2. The Rocket Motor was significantly changed under AMRAAM P3I Phase 2 with an overall increase in length of 5 inches. This change upgraded the U.S. missile but will not be implemented on the FMS missile. Therefore, there are now two propulsion configurations.

Component Breakout Criterias 10 and 11. As with the Warhead , depending on how the component breakout were accomplished, the projected savings would either not be realized or the added risk to the government to procure FMS unique components would be unacceptable. The cost savings projected in the audit report use a price which includes the joint purchase of U.S. and FMS propulsion systems Beginning in lot 12, these propulsion systems will be different. If the producers procure both motors from the same vendor, the current price breaks for quantity should stay in place. If the U.S. procured the U.S. unique propulsion without the leverage of the FMS quantities which are projected to be 600 per year, the U.S. price could increase. Based on missile cost/quantity relationships from the lot 11 procurement, the price would increase 52% based on the 300 U.S. missiles per year projected in lots 14 through 17, and 32% for the 450 U.S. missiles per year projected in lots 18 through 21. This would cause the unit cost to increase rather than decrease as a result of component breakout.

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Control Section:

Component Breakout Criteria 2. The Control section was significantly changed under AMRAAM P3I Phase 2 to accommodate the increase in length of 5 inches in the propulsion section. This change upgraded the U.S. missile but will not be implemented on the FMS missile. Therefore, there are now two control section configurations.

Component Breakout Criterias 10 and 11. As with the Warhead and Rocket Motor, depending on how the component breakout were accomplished, the projected savings would either not be realized or the added risk to the government to procure FMS unique components would be unacceptable. The cost savings projected in the audit report use a price which includes the joint purchase of U.S. and FMS control sections. Beginning in lot 12, these control sections will be different. If the producers procure both sections from the same vendor, the current price breaks for quantity should stay in place. If the U.S. procured the U.S. unique control section without the leverage of the FMS quantities which are projected to be 600 per year, the U.S. price could increase. Based on missile cost/quantity relationships from the lot 11 procurement, the price would increase 52% based on the 300 U.S. missiles per year projected in lots 14 through 17, and 32% for the 450 U.S. missiles per year projected in lots 18 through 21. This would cause the unit cost to increase rather than decrease as a result of component breakout.

16. **Potential Component Breakout Candidates.** Non-Concur. All of these components are guidance section components and the rationale provided under Component Breakout Candidates above also applies for these components.

17. **Summary.** Non-Concur. We have demonstrated that the components in Table 2 and Table 3 are not stable; the performance responsibilities of the producers are cost savers to the government; and the interaction of the FMS program in maintaining a reduced cost missile are paramount in obtaining a continually improving missile for the warfighter while maintaining reasonable risks and costs.

18. **Recommendation for Corrective Action.** Non-Concur.
The System Program Director, Air-to-Air Joint System Program Office has evaluated the risks and potential cost savings of component breakout. Costs savings are not valid as a result of loss of FMS economic order quantities and the loss of the 10 year bumper-to-bumper essential performance reliability, while government risks are substantially increased as a consequence of the continuing upgrade to the AMRAAM missile.

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